REMARKS

The Office Action mailed December 16, 2003 has been reviewed and carefully considered. Claims 1 to 10 and 13 to 21 are allowed. Claims 22 and 23 have been amended. Thus, claims 1 to 10 and 13 to 23 now remain pending. Reconsideration of the above-identified application, as herein amended and in view of the following remarks, is respectfully requested.

At the outset, appreciation is expressed for the Examiner's allowance of claims 1 to 10 and 13 to 21.

Claims 22 and 23 - which were first presented in the Preliminary Amendment filed October 24, 2003 - stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Factor (U.S. Patent No. 6,281,810) in view of Wright (U.S. Patent No. 5,668,542). For the following reasons, applicant respectfully disagrees and submits that each of claims 22 and 23 are patentable over this and all other prior art herein of record and known to applicant.

Claims 22 and 23 are each in independent form and are drawn to the same basic subject matter, the difference being that claim 22 recites an apparatus whereas claim 23 recites a corresponding method. As will be apparent, the following discussion, which for brevity and ease of description is expressly directed to the recited system of claim 22, applies equally to the claimed method of claim 23.

Claim 22 recites a color flat panel display system for displaying, to an aircraft flight crew in an aircraft cockpit, aircraft flight data for use by the flight crew in operating the aircraft based on flight data information that is input to the display system. The system of claim 22 comprises three (3) recited elements: a color flat panel display screen, a first independent processor, and a second independent processor.

The color flat panel display screen presents to the flight crew an image representing the aircraft flight data. The flight data is presented on the display screen in a presentation color that is selectively formed at each of multiple locations on the display screen by concurrently illuminating predetermined combinations of the plurality of color pixels on the display screen at each such location. As is well known, color flat panel display screens are formed by a set of individually-energizable pixels (i.e. picture elements) -- typically one for each of the colors red, green and blue -- which is located at each of the multiplicity of intersections of a grid-like layout of "x" and "y" conductive paths. Thus, a color image (or a part of a color image) that is intended to be presented at any given location, or display point, on the color flat panel display screen is formed or "constructed" by concurrently illuminating a predetermined combination of the plurality of color display pixels that are located at that display point or screen location in the grid. It is the combined selective energizing, at predetermined levels, of a predetermined *combination* of the red, green and blue pixels at any given screen location that causes that screen location to be illuminated with the intended presentation color to thereby present, typically in combination with other predeterminately illuminated screen locations, a viewable color image on the display screen. Unless *each* of the plural (e.g. the red, the green and the blue) pixels at the given location are concurrently energized or illuminated as predeterminately intended, the resulting illumination at that screen location will not appear in the intended presentation color.

The first independent processor receives the flight data information that is supplied to the display system and generates a first output to the display screen for illuminating a first subset of the plural color pixels at each of the locations (i.e. display points) on the display screen.

The second independent processor also receives the flight data information supplied to the display system, but generates a second output to the display screen. This second output,

which is directed to the display screen *concurrently* with the first output of the first processor, illuminates a second subset of the plural color pixels at the same each location. That is, at each screen location or display point a first subset of the plural pixels at that screen location are illuminated by the first output of the first processor and, concurrently, a second subset of the plural pixels at that screen location are illuminated by the second output of the second processor. The result of this concurrent illumination of the first and second subsets of the plural pixels at each screen location by the respective first and second processors is that the flight data image is thereby presented on the display screen at each screen location in the presentation color formed by this concurrent illumination by the first and second processors of a predetermined combination of the first and second subsets of the plural color pixels at such each screen location. Thus, it is the concurrent illumination, at each screen location, of *both* the first and second color pixel subsets at that screen location which is effective to create on the display screen, at each screen location, the intended image or part of the image in the intended presentation color.

As should by now be apparent, in the inventive system (and method) the required concurrent predetermined illumination of the first and second subsets of the plural color pixels at each screen location to form the flight data image in the presentation color requires that each of the first and second processors generate the respective first and second outputs to illuminate the respective first and second subsets of the plural color pixels at the each screen location on the color flat panel screen. Failure of either independent processor to generate its respective output for concurrently illuminating the respective subset of color pixels at one or more screen locations will be immediately apparent to a pilot or flight crew member viewing the display since, at the very least, the proper or intended combination of the first and second subsets of the plural color pixels at the one or more screen locations will no longer display an image in the presentation color - a

presentation color formed by concurrent illumination of the predetermined combination of the plurality of color pixels at that location. As a consequence, the flight crew viewing the display screen is immediately and inherently informed and warned of possible reduced operating integrity of the aircraft flight data that is being presented or imaged on the display for their use in operating the aircraft. The inventive system and method thus advantageously signals - in the most obvious and immediately apparent manner to a pilot or flight crew member viewing the imaged data - that there is an apparent fault in the display system and that the presented data is therefore suspect.

The cited prior art fails to disclose or suggest the claimed construction, method and advantageous functionality of applicant's invention.

Factor discloses a redundant avionics display system for critical flight instruments in an aircraft. The Factor system encompasses two identical and independent computer boards (i.e. processors) for receiving sensor inputs and projecting a display image (viewable by the flight crew) on a rear projection screen at the front of the unit, which is also in front of the pilot. With illustrative reference to Fig. 1 of Factor, each processor drives a respective LCD 54 or other imaging device. A high intensity lamp 52 emits light which is passed through the LCD 54, and then through an optics assembly 48 to thereby project the resulting image onto the rear surface of a plate-like member 44, the front surface of which forms the screen that is directly viewable by the flight crew. This "screen" 44 is *not* a color flat panel display screen on which an image is generated by concurrently illuminating predetermined combinations of a plurality of color pixels at each of multiple locations on the display screen, as applicant recites in each of claims 22 and 23. Rather, Factor expressly teaches that "Like the screen 44, the optics assembly 48 or 64 is a mechanical structure, not an electrical apparatus subject to inopportune failure." (Factor Col. 4, ll. 55-57) Factor, thus, teaches *away* from the use of a color flat panel display screen of the type utilized by

applicant herein - i.e. a display screen on which images are presented by illuminating selected combinations of plural color pixels located at multiple locations *on the display screen* - to present to the flight crew an image representing aircraft flight data for use by the flight crew in operating the aircraft.

Factor teaches a variety of operating modes of a redundant avionics display system. In one mode, each of his independent processors receives and/or displays flight information from different sensors, so that each processor is capable of projecting on the display screen 44 only *some* of the flight information that is to be presented on the screen 44. In another mode, each independent processor receives all of the same sensor information, so that each processor is independently able to project onto the display screen 44 all of the flight information intended to be so presented.

Factor explains, however, that in any event it is neither intended nor desired that both independent processors *concurrently* illuminate the same locations on the display screen 44. Thus, Factor explains that:

> "Each projector 46, 52, 54 and its operating computer 30 is capable of illuminating the entire screen 44 and giving the pilot a display of the data from all six sensors or instruments. While it is possible for both computers to display all instruments at all times, simultaneous display of the same instrument from both computers is undesirable for two reasons. First, it requires very fine mechanical adjustment to make sure that each pixel matches on the screen for both projectors. Second, there is always a small uncertainty in the data from the second sensors. For example, one computer might calculate the altitude as 15,010 feet and the other as 15,015. Although these numbers are well within the error margin for an altitude indicator, it would be confusing to the pilot [to] show both figures at once either overlaid at the same location 16, or even offset in location. Therefore, normal operation of the computers, causes one projector/computer combination to illuminate, for example, the bottom row of 'instruments' or displays and the other computer to eliminate the top row. This is accomplished by the respective computer turning off the appropriate pixels in its LCD imaging unit." (Col. 5, ll. 21-40)

Factor further explains that:

> "It is preferable that the information displayed corresponding to the data from each individual sensor be projected from only one of the display creation devices. The computers will cause the respective display creation devices to project information corresponding to data from none, some or all of the sensors and selected so that information *is not simultaneously projected from both image display creation devices*. Either respective optics for each image display creation device or a common optics for both such devices distribute the images over the screen." (Col. 2, ll. 50-59) (Emphasis supplied)

Factor accordingly expressly teaches that each location on its display screen should, at any given time, be illuminated by an image projected from only *one* of its processor-driven imaging projectors. In doing so, Factor clearly teaches *away* from creating an image, at any given screen location, by generating in each processor a portion of the intended image for that screen location and then *concurrently* illuminating that screen location with the signals developed from the two independent processors. This is, of course, in addition to the fact that, because the Factor "display screen 44" is not comprised of a plurality of color pixels located at each of multiple locations on the display screen, it is neither constructed nor can it operate in accordance with the express recitations of applicant's independent claims 22 and 23.

The secondary Wright patent fails to obviate these fundamental and significant deficiencies in the Factor teachings. Indeed, given the essential differences between the system of Factor, and the system, method and advantageous operating functionality and attributes of applicant's claimed invention, applicant submits that modification of the display system of Factor to even approach the recited system and method of the present invention would require such extensive changes and reconstruction as to itself constitute invention. Nothing in Wright – which is merely cited for its alleged teaching of "a presentation color selectively formed at each of multiple locations on the display screen" -- even remotely suggests a system or method such as that recited in applicant's claims. Neither can it reasonably be said to contain any suggestion for modification of a

display system such as that of Factor to provide the apparatus, operation or functionality of applicant's claimed invention. In any event, in view of the fundamental differences between applicant's inventive system and method and the disclosed avionics display system of Factor, the wholesale reconstruction of Factor necessary to achieve the functionality, let alone the claimed system and method, of the present invention could only be attempted in impermissible hindsight with prior knowledge of applicant's inventive disclosure.

For enhanced clarity, applicant has amended each of claims 22 and 23 to more clearly indicate that the plural color pixels at each display screen location are located "on" the display screen itself - i.e. that it is the display screen that includes the illuminatable color pixels. Although it is believed that this recitation and subject matter was already inherently contained in these claims, the newly-added language makes clear that the recited "color flat panel display screen" is one in which a plurality of color pixels located at each of a multiplicity of locations "on the display screen" are predeterminately illuminatable to present an image on the display screen in a presentation color. This amendment still more clearly evidences the fundamental differences between the system, method and operative functionality of the present invention and that of the cited Factor patent.

In accordance with the foregoing, applicant submits that independent claims 22 and 23 are patentable over the prior art, including the Examiner's proffered Section 103(a) combination of Factor in view of Wright, and requests that this rejection of claims 22 and 23 be withdrawn and the entire application passed on to allowance and early issue.

It is believed that no fees or charges are required at this time in connection with the present application; however, if any such fees or charges are deemed necessary at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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